Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (currently amended) A method for converting chemical energy into a useful form, comprising:

using reactants <u>and catalyst</u> to create <u>highly vibrationally</u> excited <u>molecules</u> species, the <u>highly vibrationally</u> excited molecules being created in a catalytic reaction where at least some of <u>products</u> of the <u>catalytic reaction</u> desorb and leave a surface of the <u>catalytic reaction</u>;

coupling the <u>highly vibrationally</u> excited <u>molecules</u> species with electrons by placing the <u>highly vibrationally</u> excited <u>molecules</u> species near a conducting surface for electron-jump effect to occur;

causing at least some of kinetic energy of the highly vibrationally excited molecules to transfer to the electrons of the conducting surface, resulting in excited carriers being created;

- preating excited carriers from the coupling of the excited species;
- collecting the excited carriers; and
- converting an energy of the excited carriers into a useful form of electrical energy.
- 2. (previously presented) The method of claim 1, wherein the collecting includes collecting the excited carriers using a semiconductor.
- 3. (previously presented) The method of claim 1, wherein the converting includes converting the excited carriers into chemical potential across a diode junction.
- 4. (currently amended) The method of claim 1, wherein the converting excited carriers includes energizing with the excited carriers to energize a semiconductor device to emit electromagnetic radiation. A method for converting chemical energy into a useful form, comprising:

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using reactants and catalyst to create highly vibrationally excited molecules, the highly
vibrationally excited molecules being created in a catalytic reaction where at least some of
products of the catalytic reaction desorb and leave a surface of the catalytic reaction;
coupling the highly vibrationally excited molecules with electrons by placing the highly
vibrationally excited molecules near a conducting surface for electron-jump effect to occur;
causing at least some of kinetic energy of the highly vibrationally excited molecules to
transfer to the electrons of the conducting surface, resulting in excited carriers being created;
collecting the excited carriers; and
converting energy of the excited carriers by energizing with the excited carriers to
energize a semiconductor device to emit electromagnetic radiation.

- 5. (previously presented) The method of claim 4, wherein the semiconductor device is a light emitting diode.
- 6. (previously presented) The method of claim 4, wherein the semiconductor device is a quantum well structure.
- 7. (previously presented) The method of claim 1, wherein the using reactants includes reacting fuel with oxidizer.
- 8. (previously presented) The method of claim 1, wherein the using reactants includes allowing reactants to enter and exhaust products to leave a vicinity of the conducting surface where reactions that create the <u>highly vibrationally</u> excited <u>molecules</u> species occur.
 - 9-26. (canceled)
- 27. (currently amended) The method of claim 4 1, wherein the converting includes converting flux of the excited carriers into an inverted population of carriers in a semiconductor.
 - 28. (previously presented) The method of claim 27, further including:

extracting energy stored in the inverted population of carriers as electromagnetic radiation.

- 29. (previously presented) The method of claim 28, wherein the method further includes causing stimulated emission to extract the electromagnetic radiation.
- 30. (previously presented) The method of claim 1, wherein the collecting includes collecting the excited carriers using a semiconductor diode.
- 31. (previously presented) The method of claim 1, wherein the collecting includes collecting the excited carriers using a Schottky junction diode.
- 32. (previously presented) The method of claim 1, wherein the collecting includes collecting the excited carriers using a bipolar semiconductor.
- 33. (previously presented) The method of claim 1, wherein the collecting includes collecting the excited carriers using an n-type semiconductor.
- 34. (previously presented) The method of claim 1, wherein the collecting includes collecting the excited carriers using a p-type semiconductor diode.
- 35. (previously presented) The method of claim 1, wherein the collecting includes collecting the excited carriers using a p-n junction diode.
- 36. (previously presented) The method of claim 1, further including placing a first electrode in contact with the conducting surface.
- 37. (currently amended) A method for generating a useful form of energy, comprising:
 using one or more reactants on one or more catalyst surfaces to create <u>highly</u>
 <u>vibrationally</u> excited <u>molecules</u> species, the highly <u>vibrationally</u> excited <u>molecules</u> being created

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in a catalytic reaction where at least some of products of the catalytic reaction desorb and leave a surface of the catalytic reaction;

coupling the <u>highly vibrationally</u> excited <u>molecules</u> species with electrons by placing the <u>highly vibrationally</u> excited <u>molecules</u> species near a conducting surface for electron-jump effect to occur;

causing at least some of kinetic energy of the highly vibrationally excited molecules to transfer to the electrons of the conducting surface, resulting in excited carriers being created;

creating excited carriers from the coupling of the excited species;

collecting the excited carriers; and

converting an energy of the excited carriers into electricity a useful form of energy.

38-41. (canceled).

- 42. (previously presented) The method of claim 1, wherein the reactants include a fuel.
- 43. (previously presented) The method of claim 37, wherein the reactants include a fuel.
- 44. (previously presented) The method of claim 1, wherein the reactants include an oxidizer.
- 45. (previously presented) The method of claim 37, wherein the reactants include an oxidizer.
- 46. (previously presented) The method of claim 37, wherein the one or more catalyst surfaces include one or more step formations.
- 4/7. (new) The method of claim 37, wherein the reactants include at least H_2O_2 and the one or more catalyst surfaces include at least Ag.
- 48. (new) The method of claim 1, wherein the reactants include at least H₂O₂ and the one or more catalyst surfaces include at least Ag.

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49. (new) A method for an electric generator that converts chemical energy into electricity, comprising:

using reactants and catalyst to create highly vibrationally excited molecules, the highly vibrationally excited molecules being created in a catalytic reaction where at least some of products of the catalytic reaction desorb and leave a surface of the catalytic reaction;

coupling the highly vibrationally excited molecules with electrons by placing the highly vibrationally excited molecules near a conducting surface for electron-jump effect to occur;

causing at least some of kinetic energy of the highly vibrationally excited molecules to transfer to the electrons of the conducting surface, resulting in excited carriers being created; collecting the excited carriers; and

converting energy of the excited carriers into electrical energy with efficiency greater than 2% of catalytic reaction energy.